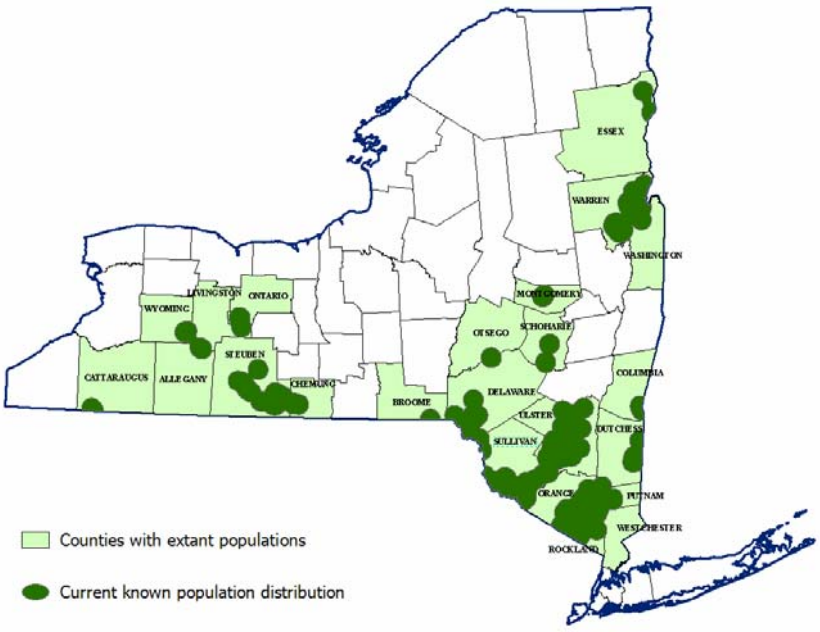
Guidelines for Reviewing Projects for Potential Impacts to the Timber Rattlesnake

The timber rattlesnake (*Crotalus horridus*) is listed as a *threatened* species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a "take", which includes, but is not limited to, adverse modification, degradation or destruction of occupied habitat of any species listed as endangered or threatened pursuant to the above laws and regulations. In New York, timber rattlesnakes are typically associated with steep-slopes and rocky terrain of deciduous or mixed deciduous/coniferous forest. They are, however, known to use and/or move through a wide variety of land types (e.g. wetlands and early successional habitats) during a typical seasonal activity cycle. In areas where movement is not impeded by artificial barriers (e.g. major roads and urban areas) timber rattlesnakes may migrate three miles or more from their den each summer in search of essential summer habitats (e.g. basking and gestating areas), food, and mating partners. Human-rattlesnake interactions are most likely to occur during the summer and early autumn when movement rates peak and snakes are typically at their maximum distance from the den; in some locations, migration routes may require snakes to pass through residential developments or other areas of intensive land use. Where multiple den sites are clustered in relatively close proximity, areas of potential range overlap between snakes from different dens may be particularly important locations for continued gene flow. Thus, avoiding fragmentation of these areas of genetic exchange is critical for the long-term viability of a local population.



Timber rattlesnake distribution in New York State

Impact Assessment Requirements

For projects that have been determined to be in close proximity to a known timber rattlesnake den, the project design will need to avoid alteration of suitable habitats and incorporate mitigation measures to prevent impacts to the snakes that would constitute a take under ECL Section 11-0535. Where the landscape will be significantly altered, mitigation is difficult and avoiding impacts may require detailed information about timber rattlesnakes on and around the project site. Therefore, if it has been determined that a potential taking could result from the project, the following information may be required to assess the potential project-related impacts on timber rattlesnakes: 1) habitat assessment [identify all suitable hibernacula, transient habitat, and summer range, 2) site usage, and 3) movement between summer and winter habitats.

Habitat Assessment

Due to the species' large home range and multiple habitat requirements a habitat assessment (PFBC-NDS, 2004) should be conducted to determine the presence of suitable basking, foraging, gestating and denning habitat or potential travel corridors within the project boundaries. Information collected for each area identified as potentially suitable habitat should include, at minimum, a habitat description and geographic location (i.e. GPS coordinates). Results of the habitat assessment will determine what additional information and/or mitigation may be required. Locations identified as potential habitat will also be used as the primary focus areas of presence-absence surveys, if necessary. Habitat assessments must be conducted by individuals that have knowledge of timber rattlesnake ecology.

Population Surveys

If the project site contains suitable habitat(s), it may be assumed rattlesnakes utilize the site during some stage of their annual cycle and the potential impacts to the species and their habitats should be assessed and mitigation measures (see Mitigation Recommendations) should be incorporated into the project design. If any of the above habitat elements occur on or in close proximity to the project site ***AND*** usage of the site by timber rattlesnakes will not be assumed, then surveys to detect the presence (e.g. den emergence, basking and gestating habitat searches) and site usage/snake movement (e.g. radio telemetry) should be conducted.

Population surveys (Casper *et al.* 2001) must be conducted during the time when timber rattlesnakes are not hibernating and can be expected to be active. To ensure accurate results, surveys should only be conducted between April 15th and October 31st on days when the air temperatures is 66^{o} F or greater ***AND*** there is no appreciable precipitation.

To adequately assess the site for the presence (or probable absence) of timber rattlesnakes, each location identified as suitable basking, gestating, or denning habitat or as a potential travel corridor should be visited at least four (4) times within the survey period, and visits to each suitable habitat location should be separated by seven (7) or more days.

Survey to detect the presence of timber rattlesnakes at potential den habitats are confined to the beginning and end of the active season when snakes are most likely to be detected at or near den sites. Thus, two (2) visits per potential den should occur post den emergence between April 15th and May 15th, and an additional two (2) visits per potential den should occur between September 15th and October 25th when the snakes are congregating around dens prior to den ingress for winter hibernation.

The collection of site usage and snake movement data may require telemetric monitoring (via external and/or internal radio transmitters) to record the location and behavior of a representative sample of snakes throughout their annual cycle. In order to assess movement patterns, or to be reasonably certain that rattlesnakes do not use specific areas of a proposed project site, up to three field seasons of data collection may be required (a minimum of two full activity cycles of data are recommended). Contingent upon the data collection requirements of the project, a detailed scope of work should be developed by the project sponsor (in consultation with Department staff) and approved by the Department prior to the initiation of any field work.

All timber rattlesnake population surveys should be conducted by individuals that have knowledge of the species' ecology, and surveys that may involve handling snakes (e.g. marking, radio telemetry) must be conducted by individuals that have experience with such techniques and are licensed by New York State to handle timber rattlesnakes.

Threats

- Loss and/or degradation of habitat - residential and commercial development and mining operations eliminate available habitat and may degrade that which is not destroyed (e.g. stormwater runoff, use of residential chemicals).

- Persecution and illegal collection - increased human activity in timber rattlesnake habitats increases the potential for snake mortality from intentional killing of snakes by humans. A higher rate of illegal collection (effective mortality) for the pet trade is also often a result of increased human presence near timber rattlesnake populations.

- Fragmentation and road mortality - the species' large home range and a high degree of site fidelity result in timber rattlesnakes typically following the same route each year during long-distance migrations between habitats. Thus, any newly-constructed road that intersects a snake's traditional travel route will become either an impassable barrier to migration or an annual road-mortality hazard.

Mitigation Recommendations

The following is a list of potential mitigation methods that may be used to avoid or minimize certain project-related impacts; however, not all methods are appropriate for all projects.

- Seasonal restrictions

  All allowable disturbance activities, including movement of construction vehicles, excavation, and alteration of vegetation, should be conducted during the period when the snakes would be expected to be hibernating and are less likely to be directly impacted by above-ground disturbances. The acceptable work period is November 1st through March 31st.

  Habitat management (including timber harvesting) and trail maintenance activities should also be timed to minimize the potential for injury/death of snakes. Habitats that are actively managed (e.g. mowing and prescribed burning) and trailsides that are cleared using a brush hog may increase mortality as snakes are killed by machinery or incinerated by fire (Means and Campbell, 1982b)

  In addition to the seasonal restrictions applied to vegetation management practices, disturbance to non-transient habitats should be avoided at ***ALL*** times. Roads, skid trails and landings should be kept at least 330 feet from all known or potentially suitable basking and gestating habitats, and to minimize the potential for collapse or disturbance of dens, heavy equipment and site preparation work (e.g. disk-harrowing, shearing, root-raking) should be prohibited within 660 feet of any known hibernacula.

- Timber rattlesnake monitor

  If any project-related work is to occur (in whole or in part) during April 1st through October 31st, the project sponsor should retain the services of a snake monitor. The snake monitor must be a qualified biologist that has knowledge of timber rattlesnake ecology and relocation procedures. The monitor must also have experience handling rattlesnakes and be licensed by New York State to do so.

  The snake monitor should be on site during all construction activities and would be responsible for: 1) conducting reconnaissance surveys for timber rattlesnakes within the work area prior to the initiation of any disturbance activities, and 2) relocating snakes as required.

- Temporary barrier

When disturbance is likely to occur from actions occurring outside of the acceptable work periods, a temporary restrictive (Stechert, 2001) barrier may help to avoid impacts if installed around the perimeter of the disturbance footprint of small projects (< 1 acre). The barrier should be: 1) installed before the end of the acceptable work period and maintained until the end of the construction phase of the project or until the beginning of the next acceptable work period, whichever occurs first, 2) inspected daily and, if necessary, repaired immediately to a fully functional condition*, and 3) constructed in accordance with the following design specifications:

- made of ¼ inch square hardware cloth or wire mesh
- a minimum of 48" high
- anchored into the ground with reinforcement bars placed on the "disturbance side" of the barrier and spaced between 6 – 8 feet apart.
- secured at the base (barrier/ground interface) with at least 6" of fence material covered with soil backfill

* The effectiveness of the barrier will be diminished and snakes may be able to gain access to the disturbance area if debris (e.g. tree limbs, soil) is allowed to overtop or pile up along side of the barrier.

- Education

Persecution by humans is a significant source of timber rattlesnake mortality and is thought to be a major contributing factor to the population declines experienced by the species over the past 100 years. Misconceptions about the actual versus perceived threat posed by timber rattlesnakes often leads to the snakes being injured or killed by humans who, when encountering a timber rattlesnake, are fearful of being attacked. Prospective residents in subdivisions located near known den sites should be provided with educational materials that help identify timber rattlesnakes and accurately describe the snakes' non-aggressive behavior. Educational materials should also include information about the Department's nuisance rattlesnake relocation program. The subdivision's prospectus could also be required to disclose the potential for the presence of timber rattlesnakes on the property. Homeowners and local law enforcement agencies should be provided with phone numbers of nuisance rattlesnake responders in the area.

- Habitat creation/enhancement

In some locations, natural succession may cause shading-over of hibernacula or essential summer habitats. Such habitat suitability changes, particularly that of gestating and birthing areas, can decrease the long-term viability of the location's timber rattlesnake population. Vegetation thinning to reclaim the site or the establishment of open stone piles to create escape cover and basking areas may mitigate some of habitat lost to successional changes. In such cases, the development of a site management plan, along with a long-term commitment by the landowner, may more than offset the loss of non-essential habitat resulting from project-related actions.

- Herp tunnel

Where roads and highways separate summer and winter habitats, it may be possible to maintain migration corridors via herp tunnels.

Nuisance Rattlesnake Responders (Region 3): The individuals listed below are qualified and licensed to relocate nuisance rattlesnakes.

Orange County

Fort Montgomery

1	Ed McGowen	(845) 446-5916

Highland Mills

2	Bob Savarese	(845) 928-7815

Warwick

3	Marty Kupersmith	(845) 986-6235 work (914) 262-3246 cell
4	David Griggs (ERS Consultants)	(845) 987-1774 work (845) 988-6029 cell
5	Tim & Susan Sharko	(845) 988-9369

Rockland County

Pomona

6	Gene Herskovics	(845) 685-1870 pager

Spring Valley

7	John Tarrant (Outragehisss Pets)	(845) 352-4477 work (845) 642-6594 cell

Sullivan County

Narrowsburg

8	Randy Stechert	(845) 252-3517
9	Kathy & Tom Michell	(845) 252-3501

Ulster County

New Paltz

10	Ed Dashnau	(845) 255-4176

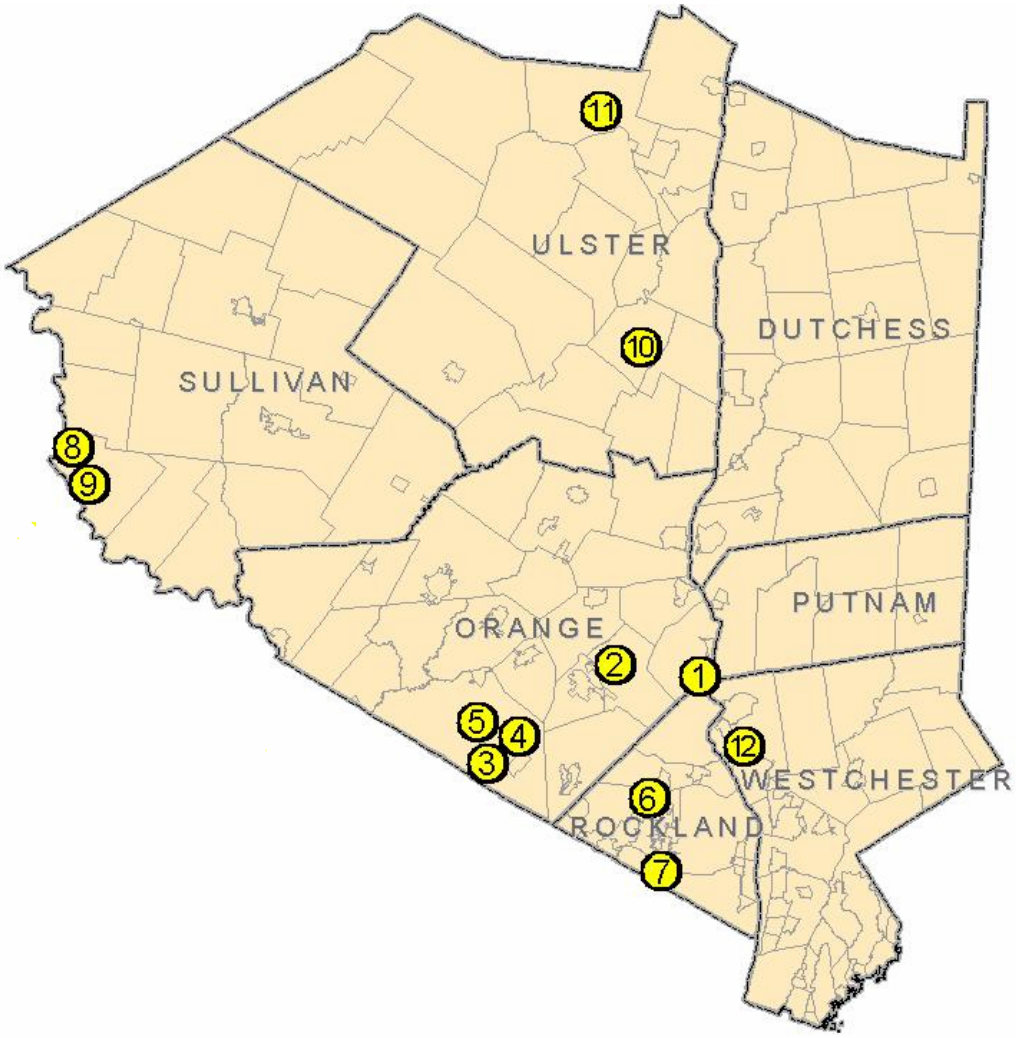
Woodstock

11	Gregory VanBogart	(845) 679-5714

Westchester County

Peekskill

12	Chris Camacho	(914) 584-1088



Revised 7/31/2009; SJJ

References

Brown, W. S. 1993. Biology, status, and management of the timber rattlesnake (*Crotalus horridus*): a guide for conservation. SSAR Herp. Circ. No. 22. vi + 78 pp.

Casper et al. 2001. *Recommended Standard Survey Protocol For the Eastern Massasauga, Sistrurus catenatus catenatus*. Unpublished.

Means, D. Bruce and Howard W. Campbell. 1982b. Effects of prescribed burning on amphibians and reptiles. Pages 89-97 *in* G. W. Wood, editor. Prescribed fire and wildlife in Southern forests. Proceedings of a symposium. Belle W. Baruch Forest Science Institute, Clemson University, Clemson, South Carolina, USA.

PFBC-NDS. 2004. Pennsylvania Fish and Boat Commission Natural Diversity Section Timber Rattlesnake Presence-Absence Survey Guidelines (Form-06, revised 3/9/04).

Stechert, R. 2001. Effectiveness of an experimental timber rattlesnake (*Crotalus horridus*) exclusion fence at Schunemunk Mountain, Town of Woodbury, Orange County, New York. Report to the Eastern Chapter of the New York Natural Conservancy and the New York State Department of Environmental Conservation. 23p.

Related Resources and Links

New York Natural Heritage Program

New York Natural Heritage Program. 2008. Online Conservation Guide for *Crotalus horridus*. Available from: http://www.acris.nynhp.org/guide.php?id=7536

NatureServe Explorer

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer

NYSDEC

New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources. 2006. Timber Rattlesnake Fact Sheet. http://www.dec.ny.gov/animals/7147.html

Timber Rattlesnake Project Screening Process

(Process should be used when the NYNHP database indicates the presence of a timber rattlesnake occurrence within 1.5 miles of a proposed project site)

Protection Status
New York: Threatened
Federal: Not Listed

1. Does the action involve permanent alteration of land or any of the following disturbances?

- Residential or commercial development in an otherwise relatively undeveloped landscape
- Construction of roads, skid trails, parking lots, canals, power lines, or other linear utilities
- Substantial increase of human usage of the site (including increased vehicle traffic)
- Placement of permanent barriers including fences, ditches or retaining walls
- Blasting, mineral extraction, or oil and natural gas drilling/refining
- Excavation or use of heavy equipment
- Construction of recreational trails (including off-road vehicle trails)
- Timber harvesting (including site preparation & landings placement)

No

2. Does the project involve temporary or seasonal disturbance activities such as mowing, prescribed burning, or trail maintenance?

No → **A**

Yes

3. Does the intervening land use between the project site and all known timber rattlesnake den sites include significant dispersal barriers such as major roads (e.g. I87, I84, Rt 17), large water bodies (e.g. Hudson River, DEP Reservoirs) or urban areas?

No

4. Will any of these temporary or seasonal disturbance activities occur (in whole or in part) during the period March 15 through November 1?

No

5. Is the proposed project within 0.25 miles of a known, extant timber rattlesnake den site?

No → **A**

Yes or Unknown → **B***

Yes or Unknown → **D**

Yes → **A**

Yes or Unknown

2. Does the intervening land use between the project site and all known timber rattlesnake den sites include significant dispersal barriers such as major roads (e.g. I87, I84, Rt 17), large water bodies (e.g. Hudson River, DEP Reservoirs) or urban areas?

No or Unknown

3. Are there any known, extant timber rattlesnake dens on or within 0.5 miles of the project site?

No → **B***

Yes → **C****

Yes → **A**

A **The proposed project is not likely to have a significant impact on the timber rattlesnake population; no further review regarding timber rattlesnakes at this site is necessary at this time.**

B **The potential for adverse impacts may exist.**
A habitat assessment should be conducted to determine the presence of travel corridors or suitable basking, foraging, gestating or denning habitat within the project boundaries.

If any of these habitat elements exist on site, it should be assumed rattlesnakes utilize the site during some stage of their annual cycle and the potential impacts to the species and their habitats should be assessed.

C **The potential for adverse impacts may exist.**
Surveys to determine the site usage and movement patterns of timber rattlesnakes should be conducted.
In order to be reasonably certain that rattlesnakes do not use the project site, up to three field seasons of data collection may be required.

All disturbance activities should be conducted during the period when the snakes would be expected to be hibernating and are unlikely to be directly impacted by above-ground disturbances.

D **If any project-related work is to proceed (in whole or in part) during the timber rattlesnake active period, the project sponsor should retain the services of a snake monitor.**
The snake monitor must be a qualified biologist that has knowledge of timber rattlesnake ecology and relocation procedures.
The monitor must also have experience handling rattlesnakes and be licensed by New York State to do so.

*** Habitat assessments must be conducted by individuals that have knowledge of timber rattlesnake ecology.**

**** Surveys to detect the presence/probable absence or that require marking/radio-tagging snakes, must be conducted by individuals that have experience handling timber rattlesnakes and are licensed by New York State to do so.**

Revised 3/16/2009; S. Joule